

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of claims:

Claims 1-6 (canceled).

Claim 7 (new): A method for adapting a pump power of an optical amplifier, comprising:

receiving an optical wavelength multiplex signal having a number of channels of different wavelengths;

amplifying the optical wavelength multiplex signal;

measuring a state of gain for the amplification

detecting a change in input or output power, wherein when the change of input power occurs within a time interval that is smaller than a reaction time of the amplifier, the accumulated input and output power is measured, and, using the measured state of gain, a new pump power value is determined so that the gain curve of the amplifier becomes substantially constant.

Claim 8 (new): The method in accordance with claim 7, wherein the state of gain is measured from a stable state.

Claim 9 (new): The method in accordance with claim 7, wherein the new pump power ($P_{\text{pump}}^{\text{after}}$) is defined in accordance with a switching process changing the input power by the following characteristics:

$$P_{\text{pump}}^{\text{after}} = P_0 \cdot \left[\exp \left\{ \frac{P_{\text{eff}}^{\text{after}}}{P_0} \right\} - 1 \right] \text{ with}$$

$$P_{\text{eff}}^{\text{after}} = P_{\text{eff}}^{\text{before}} + \frac{\bar{\lambda}_{\text{signal}}}{\lambda_{\text{pump}}} \cdot \frac{1}{G_{\text{norm}}} \cdot \{ P_{\text{sig,out}}^{\text{after}} - P_{\text{sig,in}}^{\text{after}} - P_{\text{sig,out}}^{\text{before}} + P_{\text{sig,in}}^{\text{before}} \} \text{ and}$$

$$P_{\text{eff}}^{\text{before}} = P_0 \cdot \ln \left\{ 1 + \frac{P_{\text{pump}}^{\text{before}}}{P_0} \right\}$$

with the variables ($P_{\text{sig,out/in}}^{\text{after}}$) being measurement variables which are recorded within a period of a few 10 μs after the switching process in which the gain of the amplifier changes, and wherein

($P_{\text{sig,out}}^{\text{after}}$) designates the accumulated output power after the switching process,

($P_{\text{sig,in}}^{\text{after}}$) is the accumulated input power after the switching process,

($P_{\text{sig,out}}^{\text{before}}$) is the accumulated output power before the switching process,

($P_{\text{sig,in}}^{\text{before}}$) is the accumulated input power before the switching process,

($\bar{\mu}_{\text{signal}}$ and μ_{pump}) are the average signal wavelength after the switching process or the pump wavelength, (G_{norm} , P_0) are two calibration parameters of the optical amplifier, ($P_{\text{pump}}^{\text{before}}$) is the measured pump power before the switching process and $p_{\text{eff}}^{\text{before/after}}$ are effective powers which do not take account of any loss mechanisms.

Claim 10 (new): The method in accordance with claim 8, wherein given an average gain of an EDFA amplifier without smoothing filter, the new effective pump power $P_{\text{eff}}^{\text{after}}$ is calculated in accordance with the characteristic:

$$P_{\text{eff}}^{\text{after}} = P_{\text{eff}}^{\text{before}} + \frac{\bar{\mu}_{\text{signal}}}{\mu_{\text{pump}}} \cdot \frac{G_{\text{sig}} - 1}{G_{\text{norm}}} \cdot \{P_{\text{sig,in}}^{\text{after}} - P_{\text{sig,in}}^{\text{before}}\}$$

with ($G_{\text{sig}} = \frac{P_{\text{sig,out}}^{\text{before}}}{P_{\text{sig,in}}^{\text{before}}}$) designating the ratio of the average gain over the entire

wavelength range and being assumed to be approximately constant before and after the switching process.

Claim 11 (new): The method in accordance with claim 7, wherein for a slow change of the input power, the calculation and the setting are executed successively.

Claim 12 (new): The method in accordance with claim 8, wherein, during stable states, new values of the pump power are calculated and read into a table, said values serving as support points for an interpolation for setting new pump powers for switching processes.

Claim 13 (new): The method in accordance to claim 9, wherein for N pump sources the effective pump powers before the switching process $P_{\text{eff},i}^{\text{before}}$ of each pump source are weighted and accumulated with the quotients from the average signal wavelength $\bar{\mu}_{\text{signal}}$ and the relevant pump wavelength μ_{pump} according to the formula

$$\mu_{\text{eff}}^{\text{before}} = \sum_{i=1}^N \frac{\mu_{\text{pump}}}{\mu_{\text{signal}}} \cdot P_{\text{eff},i}^{\text{before}},$$

and the effective overall pump power after the switching process $X_{\text{eff}}^{\text{after}}$ is calculated from the measured accumulated input and output powers before and after the switching process and the calibration parameter G_{norm} :

$$\mu_{\text{eff}}^{\text{after}} = \mu_{\text{eff}}^{\text{before}} + \frac{1}{G_{\text{norm}}} \cdot \{P_{\text{sig,out}}^{\text{after}} - P_{\text{sig,in}}^{\text{after}} - P_{\text{sig,out}}^{\text{before}} + P_{\text{sig,in}}^{\text{before}}\}.$$